

## SEQUENCE LISTING

<110> MINOPRIO, PAOLA

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COSSON, ALAIN

<120> CLONING, SEQUENCING, AND EXPRESSION OF A GENE ENCODING  
AN EUKARYOTIC AMINO ACID RACEMASE, AND DIAGNOSTIC,  
THERAPEUTIC, AND VACCINATION APPLICATIONS OF PARASITE  
AND VIRAL MITOGENS

<130> 03495.0200

<140> 09/725,945

<141> 2000-11-30

<150> 60/168,631

<151> 1999-12-03

<150> 60/220,207

<151> 2000-07-24

<150> 60/221,117

<151> 2000-07-27

<160> 26

-<170> PatentIn Ver. 2.1

<210> 1

<211> 418

<212> PRT

<213> Trypanosoma cruzi

<400> 1

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20 25 30

Gln Glu Lys Leu Leu Phe Asp Gln Lys Tyr Lys Ile Ile Lys Gly Glu

35 40 45

Lys Lys Glu Lys Lys Lys Asn Gln Arg Ala Asn Arg Arg Glu His Gln

50 55 60

Gln Lys Arg Glu Ile Met Arg Phe Lys Lys Ser Phe Thr Cys Ile Asp

65 70 75 80

Met His Thr Glu Gly Glu Ala Ala Arg Ile Val Thr Ser Gly Leu Pro

85 90 95

His Ile Pro Gly Ser Asn Met Ala Glu Lys Lys Ala Tyr Leu Gln Glu

100 105 110

Asn Met Asp Tyr Leu Arg Arg Gly Ile Met Leu Glu Pro Arg Gly His  
115 120 125

Asp Asp Met Phe Gly Ala Phe Leu Phe Asp Pro Ile Glu Glu Gly Ala  
130 135 140

Asp Leu Gly Met Val Phe Met Asp Thr Gly Gly Tyr Leu Asn Met Cys  
145 150 155 160

Gly His Asn Ser Ile Ala Ala Val Thr Ala Ala Val Glu Thr Gly Ile  
165 170 175

Val Ser Val Pro Ala Lys Ala Thr Asn Val Pro Val Val Leu Asp Thr  
180 185 190

Pro Ala Gly Leu Val Arg Gly Thr Ala His Leu Gln Ser Gly Thr Glu  
195 200 205

Ser Glu Val Ser Asn Ala Ser Ile Ile Asn Val Pro Ser Phe Leu Tyr  
210 215 220

Gln Gln Asp Val Val Val Val Leu Pro Lys Pro Tyr Gly Glu Val Arg  
225 230 235 240

Val Asp Ile Ala Phe Gly Gly Asn Phe Phe Ala Ile Val Pro Ala Glu  
245 250 255

Gln Leu Gly Ile Asp Ile Ser Val Gln Asn Leu Ser Arg Leu Gln Glu  
260 265 270

Ala Gly Glu Leu Leu Arg Thr Glu Ile Asn Arg Ser Val Lys Val Gln  
275 280 285

His Pro Gln Leu Pro His Ile Asn Thr Val Asp Cys Val Glu Ile Tyr  
290 295 300

Gly Pro Pro Thr Asn Pro Glu Ala Asn Tyr Lys Asn Val Val Ile Phe  
305 310 315 320

Gly Asn Arg Gln Ala Asp Arg Gly Thr Ser Ala Lys Met Ala Thr Leu  
325 330 335

Tyr Ala Lys Gly Gln Leu Arg Ile Gly Glu Thr Phe Val Tyr Glu Ser  
340 345 350

Ile Leu Gly Ser Leu Phe Gln Gly Arg Val Leu Gly Glu Glu Arg Ile  
355 360 365

Pro Gly Val Lys Val Pro Val Thr Lys Asp Ala Glu Glu Gly Met Leu  
370 375 380

Val Val Thr Ala Glu Ile Thr Gly Lys Ala Phe Ile Met Gly Phe Asn  
385 390 395 400

Thr Met Leu Phe Asp Pro Thr Asp Pro Phe Lys Asn Gly Phe Thr Leu  
405 410 415

Lys Gln

<210> 2

<211> 389

<212> PRT

<213> Trypanosoma cruzi

<400> 2

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Lys Gly Glu Lys Lys Glu Lys Lys Lys Asn Gln Arg Ala Asn Arg Arg

20 25 30

Glu His Gln Gln Lys Arg Glu Ile Met Arg Phe Lys Lys Ser Phe Thr

35 40 45

Cys Ile Asp Met His Thr Glu Gly Glu Ala Ala Arg Ile Val Thr Ser

50 55 60

Gly Leu Pro His Ile Pro Gly Ser Asn Met Ala Glu Lys Lys Ala Tyr

65 70 75 80

Leu Gln Glu Asn Met Asp Tyr Leu Arg Arg Gly Ile Met Leu Glu Pro

85 90 95

Arg Gly His Asp Asp Met Phe Gly Ala Phe Leu Phe Asp Pro Ile Glu

100 105 110

Glu Gly Ala Asp Leu Gly Met Val Phe Met Asp Thr Gly Gly Tyr Leu

115 120 125

Asn Met Cys Gly His Asn Ser Ile Ala Ala Val Thr Ala Ala Val Glu

130 135 140

Thr Gly Ile Val Ser Val Pro Ala Lys Ala Thr Asn Val Pro Val Val

145 150 155 160

Leu Asp Thr Pro Ala Gly Leu Val Arg Gly Thr Ala His Leu Gln Ser

165 170 175

Gly Thr Glu Ser Glu Val Ser Asn Ala Ser Ile Ile Asn Val Pro Ser

180 185 190

Phe Leu Tyr Gln Gln Asp Val Val Val Val Leu Pro Lys Pro Tyr Gly

195 200 205

Glu Val Arg Val Asp Ile Ala Phe Gly Gly Asn Phe Phe Ala Ile Val

210 215 220

Pro Ala Glu Gln Leu Gly Ile Asp Ile Ser Val Gln Asn Leu Ser Arg

225 230 235 240

Leu Gln Glu Ala Gly Glu Leu Leu Arg Thr Glu Ile Asn Arg Ser Val

245 250 255

Lys Val Gln His Pro Gln Leu Pro His Ile Asn Thr Val Asp Cys Val

260 265 270

Glu Ile Tyr Gly Pro Pro Thr Asn Pro Glu Ala Asn Tyr Lys Asn Val

275 280 285

Val Ile Phe Gly Asn Arg Gln Ala Asp Arg Gly Thr Ser Ala Lys Met  
290 295 300

Ala Thr Leu Tyr Ala Lys Gly Gln Leu Arg Ile Gly Glu Thr Phe Val  
305 310 315 320

Tyr Glu Ser Ile Leu Gly Ser Leu Phe Gln Gly Arg Val Leu Gly Glu  
325 330 335

Glu Arg Ile Pro Gly Val Lys Val Pro Val Thr Lys Asp Ala Glu Glu  
340 345 350

Gly Met Leu Val Val Thr Ala Glu Ile Thr Gly Lys Ala Phe Ile Met  
355 360 365

Gly Phe Asn Thr Met Leu Phe Asp Pro Thr Asp Pro Phe Lys Asn Gly  
370 375 380

Phe Thr Leu Lys Gln  
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<210> 3

<211> 29

<212> PRT

<213> Trypanosoma cruzi

<400> 3

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Pro Phe Phe Phe Phe Phe Cys Val Phe Pro Leu Ile Ser

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25

<210> 4

<211> 354

<212> PRT

<213> Trypanosoma cruzi

<400> 4

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5

10

15

Glu Ala Ala Arg Ile Val Thr Ser Gly Leu Pro His Ile Pro Gly Ser

20

25

30

Asn Met Ala Glu Lys Lys Ala Tyr Leu Gln Glu Asn Met Asp Tyr Leu

35

40

45

Arg Arg Gly Ile Met Leu Glu Pro Arg Gly His Asp Asp Met Phe Gly

50

55

60

Ala Phe Leu Phe Asp Pro Ile Glu Glu Gly Ala Asp Leu Gly Met Val

65

70

75

80

Phe Met Asp Thr Gly Gly Tyr Leu Asn Met Cys Gly His Asn Ser Ile

85

90

95

Ala Ala Val Thr Ala Ala Val Glu Thr Gly Ile Val Ser Val Pro Ala



100 105 110

Lys Ala Thr Asn Val Pro Val Val Leu Asp Thr Pro Ala Gly Leu Val

115 120 125

Arg Gly Thr Ala His Leu Gln Ser Gly Thr Glu Ser Glu Val Ser Asn

130 135 140

Ala Ser Ile Ile Asn Val Pro Ser Phe Leu Tyr Gln Gln Asp Val Val

145 150 155 160

Val Val Leu Pro Lys Pro Tyr Gly Glu Val Arg Val Asp Ile Ala Phe

165 170 175

Gly Gly Asn Phe Phe Ala Ile Val Pro Ala Glu Gln Leu Gly Ile Asp

180 185 190

Ile Ser Val Gln Asn Leu Ser Arg Leu Gln Glu Ala Gly Glu Leu Leu

195 200 205

Arg Thr Glu Ile Asn Arg Ser Val Lys Val Gln His Pro Gln Leu Pro

210 215 220

His Ile Asn Thr Val Asp Cys Val Glu Ile Tyr Gly Pro Pro Thr Asn

225 230 235 240

Pro Glu Ala Asn Tyr Lys Asn Val Val Ile Phe Gly Asn Arg Gln Ala

245 250 255

Asp Arg Ser Pro Cys Gly Thr Gly Thr Ser Ala Lys Met Ala Thr Leu

260	265	270
Tyr Ala Lys Gly Gln Leu Arg Ile Gly Glu Thr Phe Val Tyr Glu Ser		
275	280	285
Ile Leu Gly Ser Leu Phe Gln Gly Arg Val Leu Gly Glu Glu Arg Ile		
290	295	300
Pro Gly Val Lys Val Pro Val Thr Lys Asp Ala Glu Glu Gly Met Leu		
305	310	315
Val Val Thr Ala Glu Ile Thr Gly Lys Ala Phe Ile Met Gly Phe Asn		
325	330	335
Thr Met Leu Phe Asp Pro Thr Asp Pro Phe Lys Asn Gly Phe Thr Leu		
340	345	350
Lys Gln		

<210> 5

<211> 330

<212> PRT

<213> Clostridium sticklandii

<400> 5

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1	5	10	15

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20 25 30

Thr Met Ala Asp Lys Lys Lys Tyr Leu Glu Asp Asn Leu Asp Tyr Val

35 40 45

Arg Thr Ala Leu Met His Glu Pro Arg Gly His Asn Asp Met Phe Gly

50 55 60

Ser Ile Ile Thr Ser Ser Asn Asn Lys Glu Ala Asp Phe Gly Ile Ile

65 70 75 80

Phe Met Asp Gly Gly Gly Tyr Leu Asn Met Cys Gly His Gly Ser Ile

85 90 95

Gly Ala Ala Thr Val Ala Val Glu Thr Gly Met Val Glu Met Val Glu

100 105 110

Pro Val Thr Asn Ile Asn Met Glu Ala Pro Ala Gly Leu Ile Lys Ala

115 120 125

Lys Val Met Val Glu Asn Glu Lys Val Lys Glu Val Ser Ile Thr Asn

130 135 140

Val Pro Ser Phe Leu Tyr Met Glu Asp Ala Lys Leu Glu Val Pro Ser

145 150 155 160

Leu Asn Lys Thr Ile Thr Phe Asp Ile Ser Phe Gly Gly Ser Phe Phe

165 170 175

Ala Ile Ile His Ala Lys Glu Leu Gly Val Lys Val Glu Thr Ser Gln

180

185

190

Val Asp Val Leu Lys Lys Leu Gly Ile Glu Ile Arg Asp Leu Ile Asn

195

200

205

Glu Lys Ile Lys Val Gln His Pro Glu Leu Glu His Ile Lys Thr Val

210

215

220

Asp Leu Val Glu Ile Tyr Asp Glu Pro Ser Asn Pro Glu Ala Thr Tyr

225

230

235

240

Lys Asn Val Val Ile Phe Gly Gln Gly Gln Val Asp Arg Gly Thr Ser

245

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255

Ala Lys Leu Ala Thr Leu Tyr Lys Lys Gly His Leu Lys Ile Asp Glu

260

265

270

Lys Glu Val Tyr Glu Ser Ile Thr Gly Thr Met Phe Lys Gly Arg Val

275

280

285

Leu Glu Glu Thr Lys Val Gly Glu Phe Asp Ala Ile Ile Pro Glu Ile

290

295

300

Thr Gly Gly Ala Tyr Ile Thr Gly Glu Asn His Glu Val Ile Asp Pro

305

310

315

320

Glu Asp Pro Leu Lys Tyr Gly Phe Thr Val

325

330

<210> 6

<211> 314

<212> PRT

<213> Pseudomonas aeruginosa

<400> 6

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Arg Leu Val Ile Gly Gly Phe Pro Asp Leu Gly Gln Gly Asp Met Ala

20 25 30

Glu Arg Arg Arg Leu Leu Gly Glu Arg His Asp Ala Trp Arg Ala Ala

35 40 45

Cys Ile Leu Glu Pro Arg Gly Ser Asp Val Leu Val Gly Ala Leu Leu

50 55 60

Cys Ala Pro Val Asp Pro Glu Ala Cys Ala Gly Val Ile Phe Phe Asn

65 70 75 80

Asn Ser Gly Tyr Leu Gly Met Cys Gly His Gly Thr Ile Gly Leu Val

85 90 95

Ala Ser Leu Ala His Leu Gly Arg Ile Gly Pro Gly Val His Arg Ile

100 105 110

Glu Thr Pro Val Gly Glu Val Glu Ala Thr Leu His Glu Asp Gly Ser

115 120 125

Val Ser Val Arg Asn Val Pro Ala Tyr Arg Tyr Arg Arg Gln Val Ser  
130 135 140

Val Glu Val Pro Gly Ile Gly Arg Val Ser Gly Asp Ile Ala Trp Gly  
145 150 155 160

Gly Asn Trp Phe Phe Leu Val Ala Gly His Gly Gln Arg Leu Ala Gly  
165 170 175

Asp Asn Leu Asp Ala Leu Thr Ala Tyr Thr Val Ala Val Gln Gln Ala  
180 185 190

Leu Asp Asp Gln Asp Ile Arg Gly Glu Asp Gly Gly Ala Ile Asp His  
195 200 205

Ile Glu Leu Phe Ala Asp Asp Pro His Ala Asp Ser Arg Asn Phe Val  
210 215 220

Leu Cys Pro Gly Lys Ala Tyr Asp Arg Ser Pro Cys Gly Thr Gly Thr  
225 230 235 240

Ser Ala Lys Leu Ala Cys Leu Ala Ala Asp Gly Lys Leu Leu Pro Gly  
245 250 255

Gln Pro Trp Arg Gln Ala Ser Val Ile Gly Ser Gln Phe Glu Gly Arg  
260 265 270

Tyr Glu Trp Leu Asp Gly Gln Pro Gly Gly Pro Ile Val Pro Thr Ile  
275 280 285

Arg Gly Arg Ala His Val Ser Ala Glu Ala Thr Leu Leu Leu Ala Asp  
290 295 300

Asp Asp Pro Phe Ala Trp Gly Ile Arg Arg  
305 310

<210> 7

<211> 1665

<212> DNA

<213> Trypanosoma cruzi

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tgtgtgttc cctgatctc tcgaacaggg caggaaaagc ttctgttga ccaaaaatat 180  
aaaattatta agggcgagaa aaaagaaaag aaaaaaatc aacgagcaaa caggagagaa 240  
caccaacaaa aaagggaat tatgcgattt aagaaatcat tcacatgcat cgacatgcat 300  
acggaagggtg aagcagcacg gattgtgacg agtggttgc cacacattcc aggttcgaat 360  
atggcggaga agaaagcata cctgcaggaa aacatggatt attgaggcg tggcataatg 420  
ctggaaccac gtggtcatga tgatatgtt ggagccttt tattgaccc tattgaagaa 480  
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gatagcggcc ggacaattt ttgctttat tttcatttc atcttctac ccaacccct 1560  
tggttcacc ggtcgcggcg gggcttgtg ggtggaggag tcctaatcc cgcacctcg 1620  
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<210> 8

<211> 1575

<212> DNA

<213> Trypanosoma cruzi

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aaaaaaaaatc aacgagcaaa caggagagaa caccaacaaa aaagggaat tatgcgatt 180  
aagaaatcat tcacatgcat cgacatgcat acggaagggtg aagcagcacg gattgtgacg 240  
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cctgcggggt tggcgcgcg tacggcacac cttcagagtg gtactgagag tgaggtgtca 600  
aatgcgagta ttatcaatgt accctcattt ttgtatcagc aggatgtggt ggttgtgtg 660



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<210> 9

<211> 1524

<212> DNA

<213> Trypanosoma cruzi

<400> 9

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ttcatggata ccggtggcta tttaaataatg tgtggacata actcaattgc agcgggtacg 420  
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 tgcttttatt ttcattttca tcttctacc caacccccct ggtccaccg gtcgcggcgg 1440  
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<210> 10

<211> 87

<212> DNA

<213> Trypanosoma cruzi

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ttttttgtg tgttccctt gatctct

87

<210> 11

<211> 1395

<212> DNA

<213> Trypanosoma cruzi

<400> 11

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aacatggatt atttgaggcg tggcataatg ctggaaccac gtggatcatga tgatatgttt 180  
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gaaacgggaa ttgtgagcgt gccggcgaag gcaacaaatg ttccggttgt cctggacaca 360  
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ccccatatta acactgtgga ctgtgttgag atatacggtc cgccaacgaa cccggaggga 720  
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tcaacggtac cgcgttggga gcagggaagc gatagcggcc ggacaattt ttgctttat 1260  
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ggtggaggag tcctaaatcc cgcacctcgg aggaataaac atattcaat ttcatatctt 1380  
ggaatcaaaa ggcatt 1395

<210> 12

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<220>

<221> modified\_base

<222> (1)..(20)

<223> "n" represents inosine

<400> 12

ttncraada tnacnagtt 20

<210> 13

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<220>

<221> modified\_base

<222> (1)..(21)

<223> "n" represents inosine

<400> 13

athgcnttyg gnggnaaytt t

21

<210> 14

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<220>

<221> modified\_base

<222> (1)..(20)

<223> "n" represents inosine

<400> 14

ttncraada tnacnacgtt

20

<210> 15

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 15

ctctcccatg gggcaggaaa agcttctg 28

<210> 16

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 16

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<210> 17

<211> 1665

<212> DNA

<213> Trypanosoma cruzi

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<213> Artificial Sequence

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